

CLAIMS

What is claimed is:

1. A classification tree model incorporating Bayesian analysis for the statistical
5 prediction of binary outcomes.
2. The tree model of claim 1, wherein the prediction of a binary outcome is dependent on the interaction of data comprising at least two predictor variables.
3. The tree model of claim 2, wherein the data arises by case control design such that the number of 0/1 values in the response data is fixed by design.
- 10 4. The tree model of claim 3, such that the case control design assesses association between predictors and binary outcome with nodes of a tree.
5. The tree model of claim 4, such that the Bayesian analysis comprises using sequences of Bayes factor based tests of association to rank and select predictors that define a node split.
- 15 6. The tree model of claim 5, further comprising the forward generation of at least one class of trees with high marginal likelihood, wherein the prediction of said class of trees is conducted using principles of model averaging.
7. The tree model of claim 6, wherein the principle of model averaging comprises the steps of:
20 weighted prediction of a tree by determining its implied posterior probability by a score;
evaluation of the score to exclude unlikely trees;
evaluation of the posterior and predictive distribution at each node and leaf of a tree;
and
25 application of said posterior and predictive distribution to the evaluation of each tree and the averaging of predictions across trees for future predictive cases.
8. The tree model of claim 1 or 2, wherein the binary outcome is a clinical state.
9. The tree model of claim 1 or 2, wherein the binary outcome is a physiological state.

10. The tree model of claim 1 or 2, wherein the binary outcome is a physical state.
11. The tree model of claim 1 or 2, wherein the binary outcome is a disease state.
12. The tree model of claim 1 or 2, wherein the binary outcome is a risk group.
13. The tree model of claim 1 or 2, wherein the data is biological data.
- 5 14. The tree model of claim 1 or 2, wherein the data is statistical data.